

## Product Summary

$BV_{DSS}$	$R_{DS(ON)} \text{ MAX}$	$I_D$ $T_A = +25^\circ\text{C}$
40V	24mΩ @ $V_{GS} = 10\text{V}$	7.5A
	32mΩ @ $V_{GS} = 4.5\text{V}$	6.5A

## Description

This new generation MOSFET is designed to minimize the on-state resistance ( $R_{DS(ON)}$ ) and yet maintain superior switching performance, making it ideal for high efficiency power management applications.

## Applications

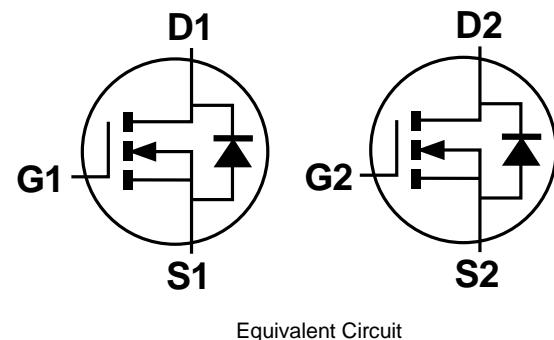
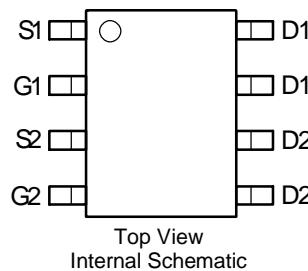
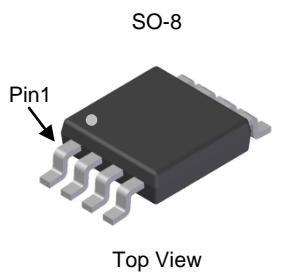
- Motor Control
- Backlighting
- Power Management Functions
- DC-DC Converters

## Features

- Rated to  $+175^\circ\text{C}$  – Ideal for High Ambient Temperature Environments
- 100% Unclamped Inductive Switching – Ensures More Reliable and Robust End Application
- Low On-Resistance
- Low Input Capacitance
- Fast Switching Speed
- **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- Qualified to AEC-Q101 Standards for High Reliability
- An Automotive-Compliant Part is Available Under Separate Datasheet ([DMNH4026SSDQ](#))

## Mechanical Data

- Case: SO-8
- Case Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminal Connections Indicator: See Diagram Below
- Terminals: Finish — Matte Tin Annealed over Copper Lead Frame. Solderable per MIL-STD-202, Method 208 (e3)
- Weight: 0.074 grams (Approximate)



Equivalent Circuit

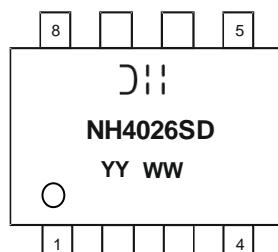
## Ordering Information (Note 4)

Part Number	Case	Packaging
DMNH4026SSD-13	SO-8	2,500/Tape & Reel

Notes:

1. No purposely added lead. Fully EU Directive 2002/95/EC (RoHS) & 2011/65/EU (RoHS 2) compliant.
2. See [http://www.diodes.com/quality/lead\\_free.html](http://www.diodes.com/quality/lead_free.html) for more information about Diodes Incorporated's definitions of Halogen- and Antimony-free, "Green" and Lead-free.
3. Halogen- and Antimony-free "Green" products are defined as those which contain <900ppm bromine, <900ppm chlorine (<1500ppm total Br + Cl) and <1000ppm antimony compounds.
4. For packaging details, go to our website at <http://www.diodes.com/products/packages.html>.

## Marking Information



DII = Manufacturer's Marking  
 NH4026SD = Product Type Marking Code  
 YYWW = Date Code Marking  
 YY = Year (ex: 16 = 2016)  
 WW = Week (01 to 53)

**Maximum Ratings** (@ $T_A = +25^\circ\text{C}$ , unless otherwise specified.)

Characteristic			Symbol	Value	Unit
Drain-Source Voltage			$V_{DSS}$	40	V
Gate-Source Voltage			$V_{GSS}$	$\pm 20$	V
Continuous Drain Current (Note 6) $V_{GS} = 10\text{V}$	Steady State	$T_A = +25^\circ\text{C}$ $T_A = +100^\circ\text{C}$	$I_D$	7.5 5.3	A
Maximum Continuous Body Diode Forward Current (Note 6)			$I_S$	2.5	A
Pulsed Drain Current (10 $\mu\text{s}$ Pulse, Duty Cycle = 1%)			$I_{DM}$	60	A
Avalanche Current (Note 7) $L = 0.1\text{mH}$			$I_{AS}$	18	A
Avalanche Energy (Note 7) $L = 0.1\text{mH}$			$E_{AS}$	18	mJ

**Thermal Characteristics**

Characteristic		Symbol	Value	Unit
Total Power Dissipation (Note 5)	$T_A = +25^\circ\text{C}$	$P_D$	1.5	W
Thermal Resistance, Junction to Ambient (Note 5)	Steady State	$R_{\theta JA}$	101	$^\circ\text{C}/\text{W}$
	$t < 10\text{s}$		59	
Total Power Dissipation (Note 6)	$T_A = +25^\circ\text{C}$	$P_D$	2.0	W
Thermal Resistance, Junction to Ambient (Note 6)	Steady State	$R_{\theta JA}$	74	$^\circ\text{C}/\text{W}$
	$t < 10\text{s}$		43	
Thermal Resistance, Junction to Case (Note 6)		$R_{\theta JC}$	10.5	
Operating and Storage Temperature Range	$T_J, T_{STG}$		-55 to +175	$^\circ\text{C}$

**Electrical Characteristics** (@ $T_A = +25^\circ\text{C}$ , unless otherwise specified.)

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
<b>OFF CHARACTERISTICS (Note 8)</b>						
Drain-Source Breakdown Voltage	$BV_{DSS}$	40	—	—	V	$V_{GS} = 0\text{V}, I_D = 250\mu\text{A}$
Zero Gate Voltage Drain Current	$I_{DSS}$	—	—	1	$\mu\text{A}$	$V_{DS} = 40\text{V}, V_{GS} = 0\text{V}$
Gate-Source Leakage	$I_{GSS}$	—	—	$\pm 100$	nA	$V_{GS} = \pm 20\text{V}, V_{DS} = 0\text{V}$
<b>ON CHARACTERISTICS (Note 8)</b>						
Gate Threshold Voltage	$V_{GS(\text{TH})}$	1	—	3	V	$V_{DS} = V_{GS}, I_D = 250\mu\text{A}$
Static Drain-Source On-Resistance	$R_{DS(\text{ON})}$	—	15	24	$\text{m}\Omega$	$V_{GS} = 10\text{V}, I_D = 6\text{A}$
		—	20	32		$V_{GS} = 4.5\text{V}, I_D = 5\text{A}$
Diode Forward Voltage	$V_{SD}$	—	0.7	1.0	V	$V_{GS} = 0\text{V}, I_S = 1.0\text{A}$
<b>DYNAMIC CHARACTERISTICS (Note 9)</b>						
Input Capacitance	$C_{iss}$	—	1060	—	$\text{pF}$	$V_{DS} = 20\text{V}, V_{GS} = 0\text{V}, f = 1.0\text{MHz}$
Output Capacitance	$C_{oss}$	—	84	—		
Reverse Transfer Capacitance	$C_{rss}$	—	58	—		
Gate Resistance	$R_g$	—	1.6	—	$\Omega$	$V_{DS} = 0\text{V}, V_{GS} = 0\text{V}, f = 1.0\text{MHz}$
Total Gate Charge ( $V_{GS} = 4.5\text{V}$ )	$Q_g$	—	8.8	—	$\text{nC}$	$V_{DS} = 20\text{V}, I_D = 8\text{A}$
Total Gate Charge ( $V_{GS} = 10\text{V}$ )	$Q_g$	—	19.1	—		
Gate-Source Charge	$Q_{gs}$	—	3.0	—		
Gate-Drain Charge	$Q_{gd}$	—	2.5	—		
Turn-On Delay Time	$t_{D(\text{ON})}$	—	5.3	—	$\text{ns}$	$V_{DD} = 25\text{V}, R_L = 2.5\Omega$ $V_{GS} = 10\text{V}, R_g = 3\Omega$
Turn-On Rise Time	$t_R$	—	7.1	—		
Turn-Off Delay Time	$t_{D(\text{OFF})}$	—	15.1	—		
Turn-Off Fall Time	$t_F$	—	4.8	—		
Body Diode Reverse Recovery Time	$t_{RR}$	—	10.5	—	$\text{ns}$	$I_F = 8\text{A}, di/dt = 100\text{A}/\mu\text{s}$
Body Diode Reverse Recovery Charge	$Q_{RR}$	—	4.15	—	$\text{nC}$	$I_F = 8\text{A}, di/dt = 100\text{A}/\mu\text{s}$

Notes:

5. Device mounted on FR-4 PC board, with minimum recommended pad layout, single sided.
6. Device mounted on FR-4 substrate PC board, 2oz copper, with thermal bias to bottom layer 1inch square copper plate
7.  $I_{AS}$  and  $E_{AS}$  rating are based on low frequency and duty cycles to keep  $T_J = +25^\circ\text{C}$ .
8. Short duration pulse test used to minimize self-heating effect.
9. Guaranteed by design. Not subject to product testing.

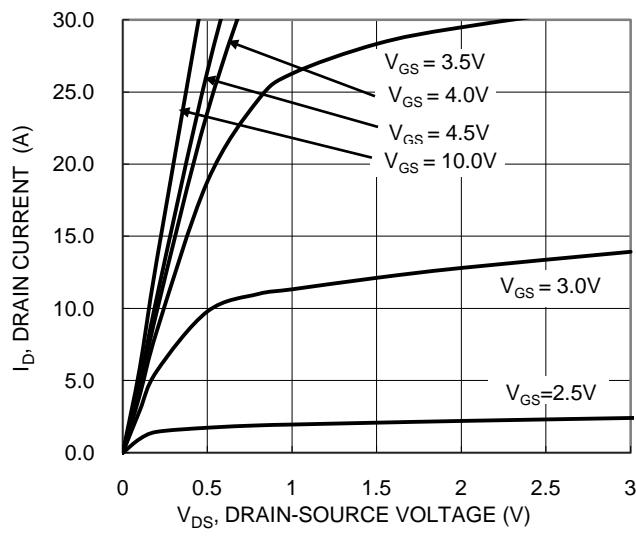


Figure 1. Typical Output Characteristic

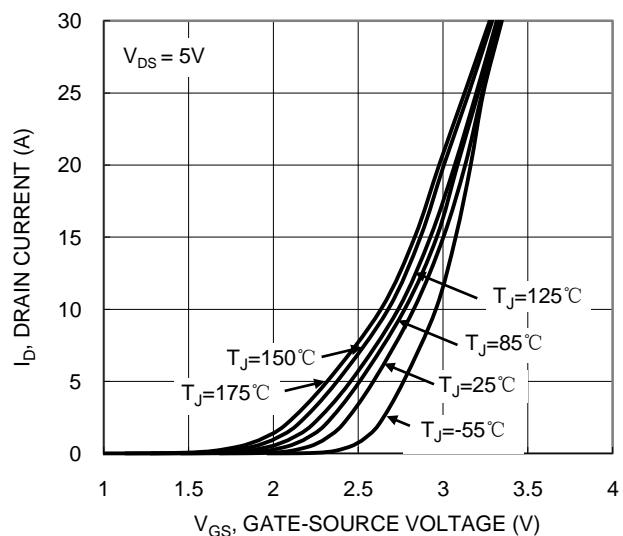


Figure 2. Typical Transfer Characteristic

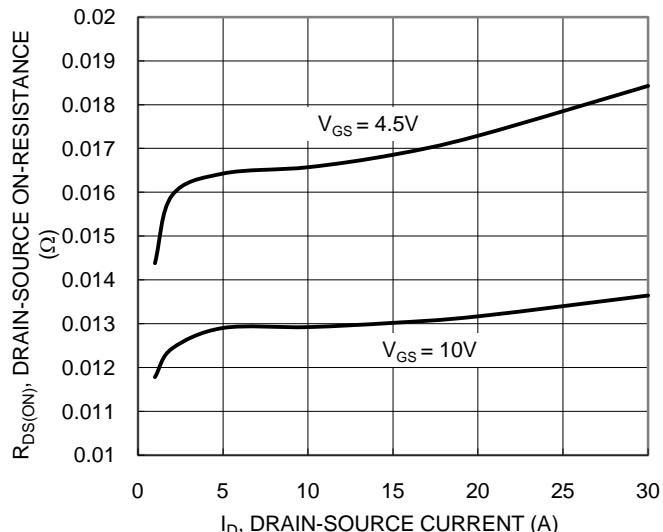


Figure 3. Typical On-Resistance vs. Drain Current and Gate Voltage

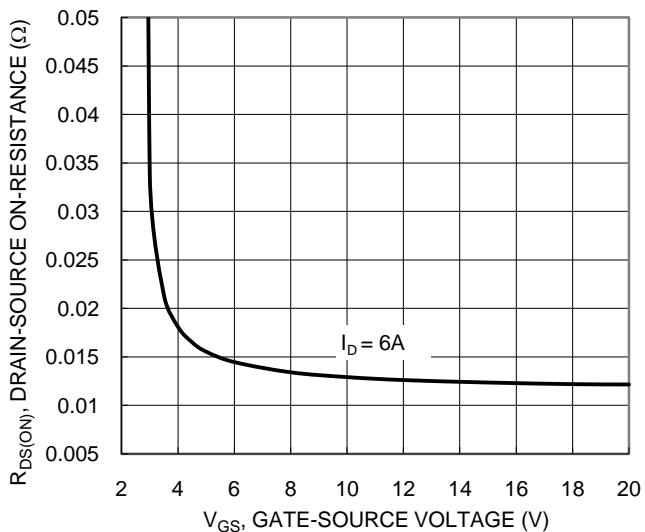


Figure 4. Typical Transfer Characteristic

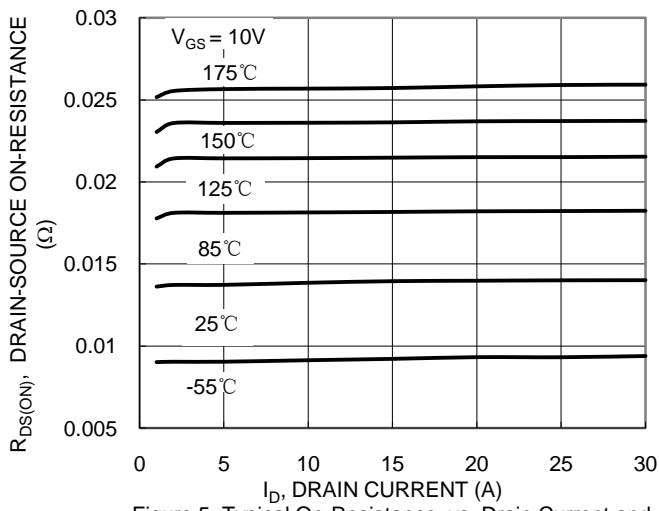


Figure 5. Typical On-Resistance vs. Drain Current and Temperature

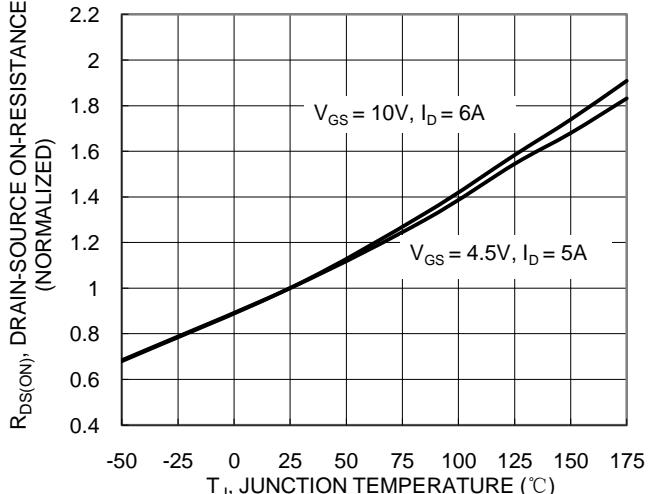
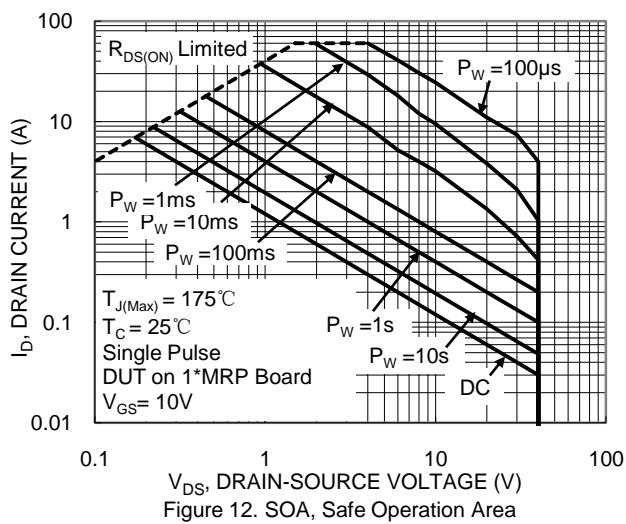
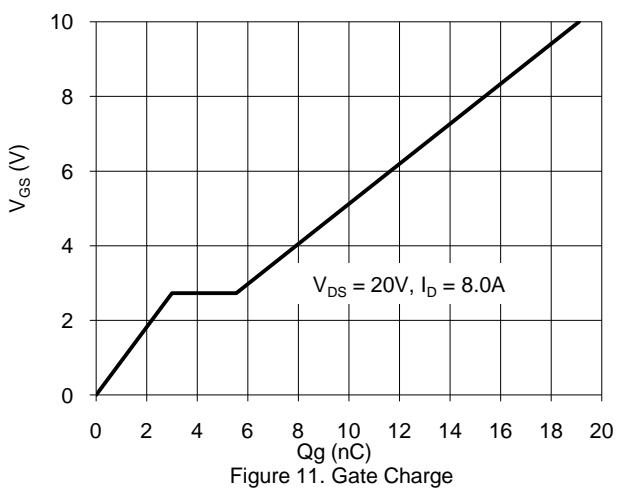
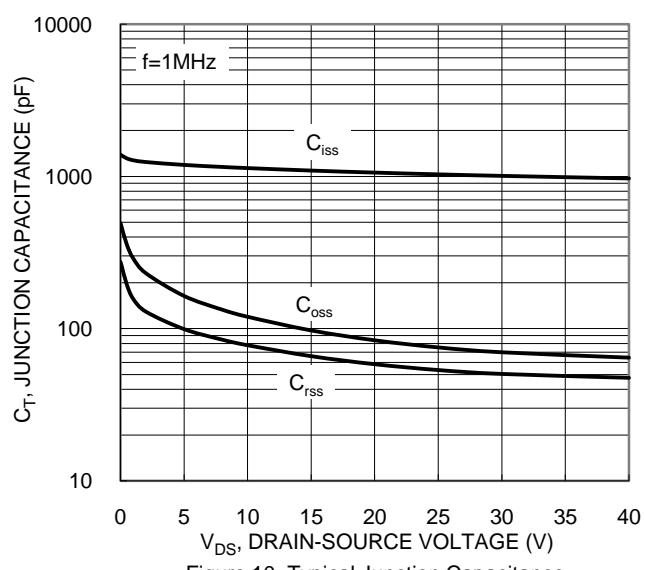
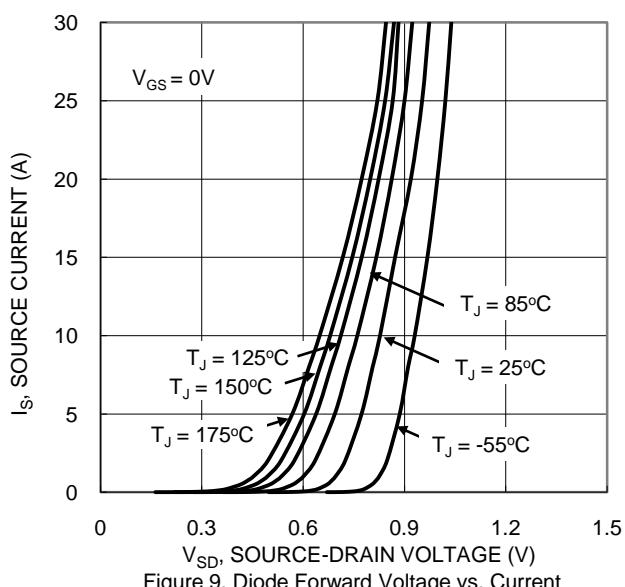
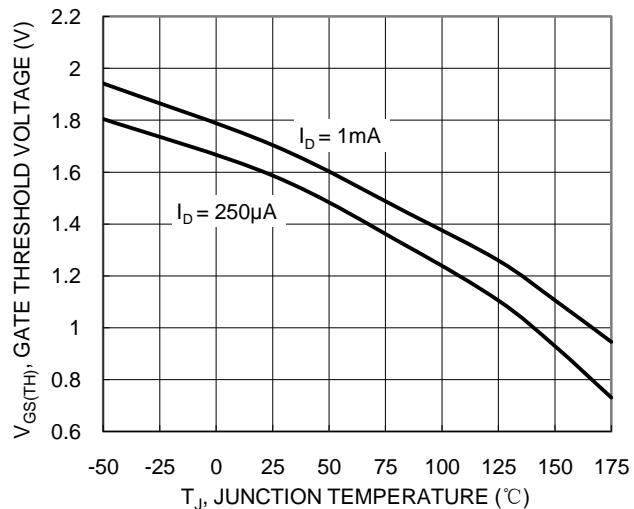
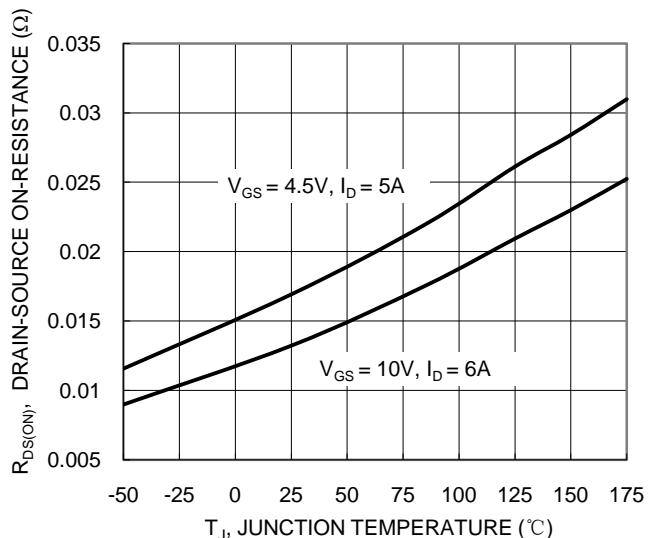


Figure 6. On-Resistance Variation with Temperature



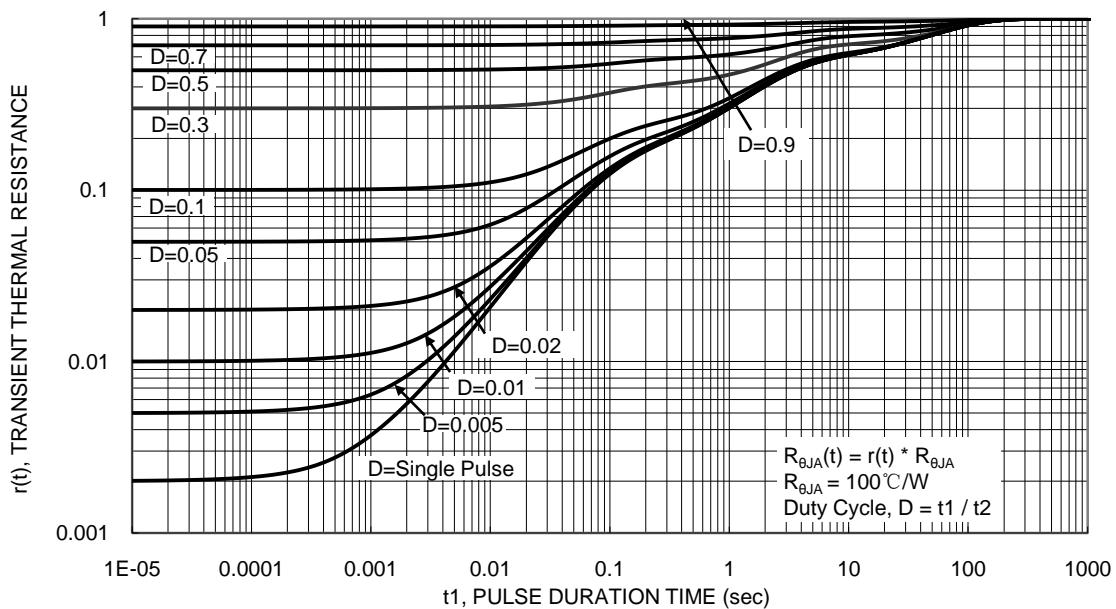
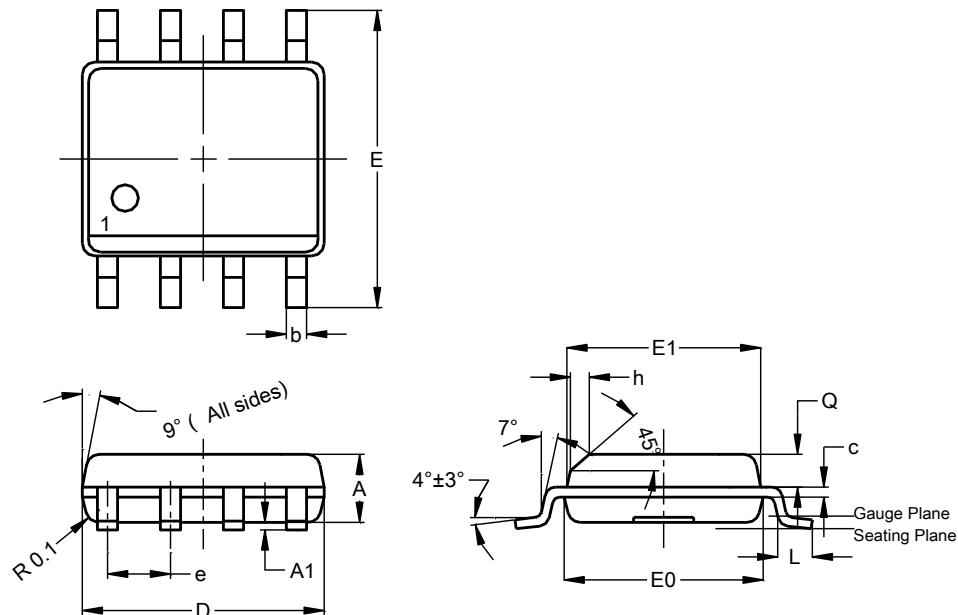


Figure 13. Transient Thermal Resistance

## Package Outline Dimensions

Please see <http://www.diodes.com/package-outlines.html> for the latest version.

SO-8



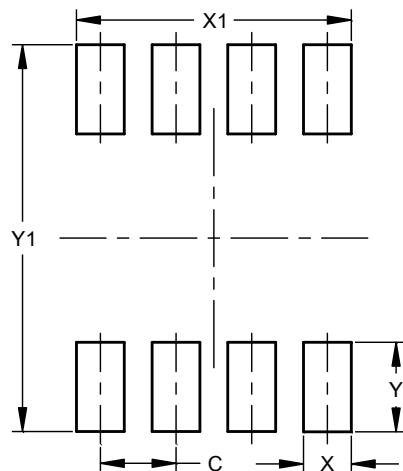
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Dim	Min	Max	Typ
<b>A</b>	1.40	1.50	1.45
<b>A1</b>	0.10	0.20	0.15
<b>b</b>	0.30	0.50	0.40
<b>c</b>	0.15	0.25	0.20
<b>D</b>	4.85	4.95	4.90
<b>E</b>	5.90	6.10	6.00
<b>E1</b>	3.80	3.90	3.85
<b>E0</b>	3.85	3.95	3.90
<b>e</b>	--	--	1.27
<b>h</b>	-	--	0.35
<b>L</b>	0.62	0.82	0.72
<b>Q</b>	0.60	0.70	0.65

All Dimensions in mm

## Suggested Pad Layout

Please see <http://www.diodes.com/package-outlines.html> for the latest version.

SO-8



Dimensions	Value (in mm)
<b>C</b>	1.27
<b>X</b>	0.802
<b>X1</b>	4.612
<b>Y</b>	1.505
<b>Y1</b>	6.50

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